

DECORATIVE RAILING ASSEMBLY FOR A BUILDING AND  
METHODS FOR MANUFACTURING SAME

Technical Field

The present invention relates to railing assemblies of the type found on porches, decks, patios, etc. of buildings, especially homes or houses. More particularly, the invention relates to a decorative railing assembly formed as a modular unit, perhaps, facilitating ease of home construction.

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Background of the Invention

Railing assemblies for porches, decks, patios and even fencing or staircases have long been known. In general, railing assemblies fit between and mount to upstanding posts, in turn, attached to a porch edge or sunk into the nearby ground. Often, the railing assemblies comprise top and bottom longitudinally-extending parallel boards, perpendicularly or angularly mounted to the upstanding posts, and pluralities of upstanding balusters fit in between the boards. The balusters often embody decorative

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spindles with designs carved therein according to a computerized design pattern fed to a computerized lathe.

Many railing assemblies, however, are sold as modular units and it is not uncommon for a single modular unit to include dozens of balusters.

5 In order to produce pluralities of modular units, scores or thousands of balusters must also be produced and each must be individually attached to the boards. This makes for labor intensive manufacturing, especially if the balusters have unique designs. Moreover, each individual baluster typically adds little strength to the overall railing assembly and, over time,  
10 can become loosened or completely knocked-out from between the top and bottom boards.

Accordingly, a need exists in the art for an easy-to-manufacture railing assembly that not only provides strength but also provides decoration and ornamentation.

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### Summary of the Invention

In accordance with the purposes of the present invention as described herein, a decorative railing assembly having strength and ease of manufacturing is provided.

20 In one embodiment, the decorative railing assembly takes the form of two longitudinally extending end rails, especially top and bottom end rails, connected to a decorative panel formed of a single workpiece of weldy material. The decorative panel has a frame that borders a coplanar design pattern cut in the workpiece by a computer-controlled router.

Preferably, the frame has a length dimension shorter than the longitudinal extent of either of the two end rails so that when attaching the railing assembly to upstanding posts, a builder need not destroy the structural integrity of the decorative panel or detract from the ornamentation of its design pattern. Preferred attachment to upstanding posts includes attaching terminal ends of the end rails perpendicularly or angularly to the posts depending upon whether the railing assembly embodies a porch or a staircase, for example.

In other embodiments, the design pattern has a substantially symmetrical pattern about a centerline of the decorative panel. The centerline may extend substantially perpendicular to the longitudinal extent of the two end rails. Methods for manufacturing the railing assembly are also disclosed.

In the following description there is shown and described possible embodiments of the invention, simply by way of illustration of one of the modes best suited to carry out the invention. As it will be realized, the invention is capable of other different embodiments, and its several details are capable of modification in various, obvious aspects all without departing from the invention. Accordingly, the drawings and descriptions will be regarded as illustrative in nature and not as restrictive.

#### Brief Description of the Drawings

The accompanying drawings incorporated in and forming a part of the specification, illustrate several aspects of the present invention, and

together with the description serves to explain the principles of the invention. In the drawings:

Figure 1 is a perspective view in accordance with the present invention of a single workpiece of material in which a decorative panel  
5 becomes formed;

Figure 2 is a front view in accordance with the present invention of a representative decorative panel having a frame bordering a design pattern;

Figure 3 is a diagram in accordance with the present invention of a  
10 suitable operating environment for cutting a design pattern in the workpiece of Figure 1;

Figure 4 is a front view in accordance with the present invention of two end rails, especially top and bottom end rails, connecting with the decorative panel of Figure 2;

15 Figure 5 is a front view in accordance with the present invention showing an assembled railing assembly including the two end rails connected with the decorative panel of Figure 4 in a manufacturing step subsequent thereto;

20 Figure 6 is a front view in accordance with the present invention of the railing assembly connected between upstanding posts;

Figure 7 is a front view in accordance with the present invention of a plurality of railing assemblies connected with upstanding posts of a building;

Figure 8 is a front view in accordance with the present invention of an alternate embodiment of a decorative panel having a partial frame bordering a design pattern;

5 Figure 9 is a front view in accordance with the present invention of another embodiment of a decorative panel having a partial frame bordering a design pattern;

Figure 10 is a front view in accordance with the present invention of a representative decorative panel, assembled to a house porch, having a substantially symmetrical design pattern;

10 Figure 11 is a front view in accordance with the present invention of another representative decorative panel, assembled to a house porch, having a substantially symmetrical design pattern;

Figure 12 is a front view in accordance with the present invention of a railing assembly configured for use on a staircase; and

15 Figure 13 is a front view in accordance with the present invention of a railing assembly alternatively configured for use on a staircase;

Reference will now be made in detail to the present invention, an example of which is illustrated in the accompanying drawings.

20 Detailed Description of the Invention

In accordance with the purposes of the present invention as described herein, a decorative railing assembly having strength and ease of manufacturing is provided for use on a building, especially a house porch or staircase.

With reference to Figure 1, a beginning or blank workpiece of the present invention is shown generally as 10 and has a front surface 12 generally parallel to a back surface 14. In a preferred embodiment, the workpiece embodies a single piece of material, especially a fiberboard, having a length dimension L of about 8 feet (preferably not-to-exceed 8 feet), a width dimension W of about 4 feet and a thickness dimension t, separating the front 10 from the back surface 14, of about 1 to about 2 inches. In other instances, the workpiece embodies a particle board composition, a piece of plywood, or a piece of any wood type, especially cherry wood, oak, poplar or other. Although the dimensions of the workpiece can vary, users of the present invention should select their length and width dimensions to have comparability to the size of the void defined between upstanding posts containing the after-described railing assembly. As is often the case with front porches of houses, for example, upstanding posts typically have separation distances of not-to-exceed about 8 feet with post heights usually extending from about 4 to 5 feet, *see*, Figure 10.

Next, with reference to Figure 2, the workpiece of single material becomes cut into a decorative panel 8 to define both a design pattern 20 and a frame 22. Preferably, the design pattern represents an ornamental or decorative design of the manufacturer's or end user's own choosing and may have suitable amounts of finishing compounds, varnishes or other applied thereon, usually after a sanding operation. As shown, the design pattern corresponds to a tree having a trunk 22 and extending upper limbs

24, 26. The frame 22 borders the design pattern and, because the frame and design pattern were cut from the same workpiece having essentially a uniform thickness  $t$ , the frame and the design pattern are essentially coplanar. In this instance, the front surface 28 of the tree lies in the same plane as the front surface 30 of the frame 22. Likewise, both the back surfaces of the tree and frame lie in a same plane. In other embodiments, however, the frame front and back surfaces may not lie co-planarly with the front and back surfaces of the design pattern. Also, the frame 22 includes a top 32, a bottom 34, and left and right side sections 36, 38 that surround a top 40, a bottom 42 and left 44 and right 46 sides of the design pattern. The frame also surrounds or borders any voids or gaps 45 left after the cutting operation.

The top, bottom, left and right side sections 32, 34, 36, 38 of the frame preferably all have comparable dimensions. As shown, the distances  $D$  of width on the front surface 30 of the frame are about 6 inches in length. Depending upon the design pattern and the amount of structural rigidity desired for the decorative panel, skilled artisans will vary the frame distance  $D$  from a few inches to as much as a foot or more.

Appreciating that users of the present invention will likely accomplish some aspect of the cutting of the design pattern via assistance of a computer in a computing system environment, Figure 3 and the following discussion are intended to provide a brief, general description of a suitable computing environment in which either the apparatus or method embodiments of the invention may be implemented. Particular

embodiments of the invention may range from computer executable instructions as part of computer readable media to hardware used in any or all of the following depicted structures. Implementation may additionally be combinations of hardware and computer executable instructions.

5           When described in the context of computer readable media having computer executable instructions stored thereon, it is denoted that the instructions include program modules, routines, programs, objects, components, data structures, etc. that perform particular tasks or implement particular abstract data types upon or within various structures of the  
10       computing environment. Executable instructions exemplarily comprise instructions and data which cause a general purpose computer, special purpose computer, or special purpose processing device to perform a certain function or group of functions.

          The computer readable media can be any available media which can  
15       be accessed by a general purpose or special purpose computer. By way of example, and not limitation, such computer readable media can comprise RAM, ROM, EEPROM, CD-ROM or other optical disk storage devices, magnetic disk storage devices or any other medium which can be used to store the desired executable instructions or data fields and which can be  
20       assessed by a general purpose or special purpose computer. Combinations of the above should also be included within the scope of the computer readable media. For brevity, computer readable media having computer executable instructions may be referred to as “software” or “computer software”.



With reference to Figure 3, an exemplary system for implementing the invention includes a general purpose computing device in the form of a conventional computer 120. The computer 120 includes a processing unit 121, a system memory 122, and a system bus 123 that couples various system components including the system memory to the processing unit 121. The system bus 123 may be any of the several types of bus structures including a memory bus or memory controller, a peripheral bus, and a local bus using any of a variety of bus architectures. The system memory includes read only memory (ROM) 124 and a random access memory (RAM) 125. A basic input/output system (BIOS) 126, containing the basic routines that help to transfer information between elements within the computer 120, such as during start-up, may be stored in ROM 124. The computer 120 may also include a magnetic hard disk drive, not shown, a magnetic disk drive 128 for reading from and writing to removable magnetic disk 129, and an optical disk 131 such as a CD-ROM or other optical media. The hard disk drive 127, magnetic disk drive 128, and optical disk drive 130 are connected to the system bus 123 by a hard disk drive interface 132, a magnetic disk drive interface 133, and an optical drive interface 134, respectively. The drives and their associated computer-readable media provide nonvolatile storage of computer readable instructions, data structures, program modules and other data for the computer 120.

Although the exemplary environment described herein employs a hard disk, a removable magnetic disk 129 and a removable optical disk

131, it should be appreciated by those skilled in the art of other types of computer readable media which can store data accessible by a computer include magnetic cassettes, flash memory cards, digital video disks, removable disks, Bernoulli cartridges, random access memories (RAMs),  
5 read only memories (ROM), and the like.

Other storage devices are also contemplated as available to the exemplary computing system. Such storage devices may comprise any number or type of storage media including, but not limited to, high-end, high-throughput magnetic disks, one or more normal disks, optical disks  
10 jukeboxes of optical disks, tape silos, and/or collections of tapes or other storage devices that are store-off line. In general, however, the various storage devices may be partitioned into two basic categories. The first category is local storage which contains information that is locally available to the computer system. The second category is remote storage  
15 which includes any type of storage device that contains information that is not locally available to a computer system. While the line between the two categories of devices may not be well defined, in general, local storage has a relatively quick access time and is used to store frequently accessed data, while remote storage has a much longer access time and is used to store  
20 data that is accessed less frequently. The capacity of remote storage is also typically an order of magnitude larger than the capacity of local storage.

A number of program modules may be stored on the hard disk, magnetic disk 129, optical disk 131, ROM 124 or RAM 125, including an operating system 135, one or more application programs 136, other

program modules 137, and program data 138. Such application programs may include, but are not limited to, graphic modules or modeling modules for generating graphics and models for users display, graphical user interfaces, image processing modules, intelligent systems modules (such as  
5 neural networks), specialized image tracking modules, camera control modules, camera acquisition modules, GUI development systems or other. One especially preferred application program includes a CorelDRAW program, graphics suite or otherwise, where users enter the design pattern  
20 (Figure 2) of their choosing. A user may enter commands and other  
10 information into the computer 120 through input devices such as keyboard 140 and pointing device 142. Other input devices (not shown) may include a microphone, joy stick, game pad, satellite dish, scanner, or the like. These and other input devices are often connected to the processing unit  
121 through a serial port interface 146 that couples directly to the system  
15 bus 123. It may also connect by other interfaces, such as parallel port, game port, firewire or a universal serial bus (USB). A monitor 147 or other type of display device is also connected to the system bus 123 via an interface, such as a video adapter 18. In addition to the monitor, computers often include other peripheral output devices (not shown), such  
20 as speakers and printers. Scanner peripheral devices (not shown) for reading imagery into the computer are often also included.

During use, the computer 120 may operate in a networked environment using logical connections to one or more other computing configurations, such as a remote computer 149. Remote computer 149

may be a personal computer, a server, a router, a network PC, a peer device or other common network node, and typically includes many or all of the elements described above relative to the computer 120, although only a memory storage device 150 having application programs 136 has been  
5 illustrated. The logical connections between the computer 120 and the remote computer 149 include a local area network (LAN) 151 and/or a wide area network (WAN) 152 that are presented here by way of example and not limitation. Such networking environments are commonplace in offices with enterprise-wide computer networks, intranets and the Internet,  
10 but may be adapted for use in a mobile or on-site manner at multiple and/or changing locations.

When used in a LAN networking environment, the computer 120 is connected to the local area network 151 through a network interface or adapter 153. When used in a WAN networking environment, the computer  
15 120 typically includes a modem 154, T1 line, satellite or other means for establishing communications over the wide area network 152, such as the Internet. The modem 154, which may be internal or external, is connected to the system bus 123 via the serial port interface 146. In a networked environment, program modules depicted relative to the computer 120, or  
20 portions thereof, may be stored in the local or remote memory storage devices and may be linked to various processing devices for performing certain tasks. It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between the computers may be used.

Additionally, a bus 155 connects the computer 120 to a router system 157 having multi-dimensional movement capabilities, especially those in the x, y and z axis planes. In this manner, a bit or other cutting/drilling device 159 can be caused to move and cut through and around the workpiece 10. Preferably, but not necessarily required, the user positions the workpiece with the front surface 12 towards the cutting/drilling device. Eventually, the control of the router system yields a decorative panel 8 as shown in Figure 2 or elsewhere. In a preferred implementation of the present invention, the router system embodies a controller and table sold by the Larken Corporation that receives DOS-based commands from an attendant computer, *e.g.*, 120.

Once the above-described router system or other is used to cut the workpiece into a decorative panel 8, a plurality of end rails become connected thereto. With reference to Figure 4, the end rails include top and bottom rails 50, 52 each having a longitudinal extent *l* that become attached to the decorative panel via mechanical and/or chemical fasteners, such as screws, bolts, nails, braces, brackets, dowels, glues, epoxies, adhesives or the like. The attaching occurs, of course, after juxtapositioning the frame top and bottom side sections 32, 34 with the top and bottom end rails 50, 52 through movement in the direction of arrows A and B.

In a preferred embodiment, the end rails have comparable dimensions, especially a longitudinal extent of about 8 feet (preferably not-to-exceed 8 feet) and a height *h* of about 2 inches. In the width direction

(not shown, but extending away from or into the paper of the Figure), the end rails have a dimension of about 4 inches. In other words, the end rails preferably embody conventionally known two-by-four pieces of lumber with a length of about 8 feet (preferably not-to-exceed 8 feet). Of course, actual two-by-fours have height and width dimensions of about 1.75 inches by about 3.75 inches, respectively.

Once attached, skilled artisans will observe the frame juxtaposes the two end rails for nearly their entirety, or entire longitudinal extent, except for a gap of distance  $d_1$  and  $d_2$  that exists on either ends of the frame 22. As will be taught hereafter, this gap will enable ease of constructing a house porch, for example. Preferably, the gaps have similar dimensions thereby symmetrically centering the decorative panel between the end rails. In one embodiment, the gaps are on the order of a few inches to a foot or more. In any embodiment, the original length dimension  $L$  of the workpiece 10 (Figure 1) carries over to the decorative panel 8 and, as shown, the length dimension of the frame is shorter than the longitudinal extent of either of the two end rails. Accordingly, the two end rails must slightly exceed 8 feet in length or the original work piece must have a length shorter than 8 feet. As before, however, this length dimension becomes dictated by the actual usage of the decorative panel.

In other embodiments, additional end rails (not shown) attach to the decorative panel along the left and right frame side sections 36, 38 in addition to or in place of the top and bottom rails 50, 52. In such instances,

it may be desirable to select an original work piece having a length dimensions a few inches shorter than 8 feet.

In Figure 5, once the decorative panel 8 becomes attached to the end rails 50, 52, a decorative railing assembly 60 results that is ready for  
5 installation on a building, such as a house porch or staircase or other. At this point, skilled artisans should appreciate that the depicted railing assembly 60 has, because of its frame juxtapositioning relative to the end rails and because its decorative panel embodies a single workpiece, considerable structural strength that exceeds most baluster-style railing  
10 assemblies. It should also be appreciated that because gaps of distance d1 and d2 exist on either ends of the frame, users of the invention have clearance space in which to install the railing assembly between upstanding posts. Even further, because the railing assembly 60 can become fashioned by a computer controlled router system, users of the invention can readily  
15 duplicate it and make and/or sell it as modular units readily transportable to home builders, stores, distributors or other.

With reference to Figure 6, the railing assembly 60 connects to upstanding posts 62 of a building, especially a house porch, by attachment of terminal ends 64 of the end rails to the upstanding posts 62. In  
20 particular, the terminal ends 64 attach substantially perpendicularly to an outer surface 66 of the posts at both a top and bottom 68, 70 thereof. Conventional mechanical and/or chemical fasteners, as described above, will suffice in the attachment. Finally, skilled artisans should appreciate that because the terminal ends of the end rails were used in connecting the

railing assembly to the upstanding posts, the frame 22 itself does not attach to the posts. In this manner, builders using the railing assemblies of the present invention need not destroy the structural integrity of the decorative panel 8 nor detract from the ornamentation of its design pattern 20. As  
5 will be shown later, some of the ornamentation can be quite elaborate.

With reference to Figure 7, pluralities of railing assemblies 60 can attach to pluralities of upstanding posts 62 in the same manner previously described. As a result, a porch 78 of a house, for example, can be easily assembled and made exquisitely ornate. As shown, however, only a single  
10 decorative panel exists between any two upstanding posts. In other embodiments, skilled artisans may learn to fashion multiple decorative panels between the posts.

In other embodiments, the decorative panel 8 of the present invention may include a partial frame 22 having only top and bottom side  
15 sections 34 such that the design pattern 20 does not become bordered around its entirety, i.e., on its left and right sides 44, 46. In all other aspects, however, the invention remains the same. For example, top and bottom end rails (not shown) will attach to edges 70, 72 of the frame and such, in turn, will attach to upstanding posts.

20 In Figure 9, the decorative panel 8 includes a design pattern 20, shaped primarily as an ornamental diamond, that is bordered by a frame having only left and right side sections 36, 38. Thereafter, the end rails will attach to the edges 74, 76 of the frame before attaching to upstanding posts.



In Figure 10, an exquisitely ornate design pattern 20, bordered on all sides by a frame 22, comprises a series of spars 80 shaped symmetrically about a centerline CL of the decorative panel. As shown, the centerline CL extends substantially perpendicular to the longitudinal extent of either of the end rails 50, 52. In other embodiments, the centerline may extend parallel to the longitudinal extent or may cut diagonally from position 82 to position 84. As a further observance, this railing assembly 60 resides some Gap distance above the surface of the porch 78. In many states, building codes require a gap to have some minimum or maximum distance.

In Figure 11, pluralities of decorative railing assemblies 60 are seen attached to upstanding posts 62 on a house porch 70. As before, the design pattern 20 exists substantially symmetrically about a centerline CL of the decorative panel. The centerline CL exists substantially perpendicularly to the end rails 50, 52. As seen, the design pattern 20 embodies an ornate tree with pluralities of branches.

Since the present invention further contemplates use on staircases, users of the invention will appreciate that pluralities of railing assemblies 60 (Figure 12) may exist between upstanding posts 62, as previously described, with the exception that adjacent ones of railing assemblies may have a vertical stagger V. In all other regards, however, the invention remains the same.

In Figure 13, the vertical stagger of upstanding posts 62 on a staircase, for example, may have fashioned there between railing

assemblies 60 with an angular disposition between terminal ends 64 of the end rails 50, 52 and outer surfaces 66 of the upstanding posts. In one embodiment, an angle  $\alpha$  exists between the outer surface 66 and the terminal end 64 of the top end rail 50 of about 75 degrees. In turn, an  
5 angle  $\beta$  exists between the frame 22 and the bottom end rail 52 of about 115 degrees. In all other regards, however, the invention remains the same.

The foregoing was chosen and described to provide the best illustration of the principles of the invention and its practical application to  
10 thereby enable one of ordinary skill in the art to utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. All such modifications and variations are within the scope of the invention as determined by the appended claims when interpreted in accordance with the breadth to which they are fairly, legally and equitably entitled.